UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

OFFICE OF THE
REGIONAL ADMINISTRATOR

December 1, 2004

Michael Pool, State Director
Bureau of Land Management
2800 Cottage Way, Suite W-1834
Sacramento, CA 95825-1886

Subject: Draft Resource Management Plan Amendment and Draft Environmental Impact Statement (DEIS) for the Clear Creek Management Area [CEQ # 040322]

Dear Mr. Pool:

The U.S. Environmental Protection Agency (EPA) has reviewed the above referenced document. Our review and comments are provided pursuant to the National Environmental Policy Act (NEPA), the Council on Environmental Quality's NEPA Implementation Regulations at 40 CFR 1500-1508, and Section 309 of the Clean Air Act. Our detailed comments are enclosed.

This DEIS analyzes specific alternatives to manage the 63,000-acre Clear Creek Management Area (CCMA), a popular off-highway vehicle (OHV) recreation area, in the Bureau of Land Management's (BLM) Hollister Resource Area. The proposed action keeps 246 miles of routes and 466 acres of barren slopes open to use, and expands the existing San Benito Mountain Research Natural Area (RNA) to 3,991 acres. This DEIS is tiered to a programmatic EIS prepared by BLM during the 1990s, which evaluated general management alternatives for the CCMA. In 1999, BLM issued a Record of Decision (ROD) selecting an alternative that would leave 270 miles of routes and 937 acres of barren slopes open to OHV use and include 4,082 acres in the RNA. EPA rated the programmatic DEIS as Environmental Objections-Insufficient Information (EO-2) due to the potential health risks from exposure to naturally occurring asbestos in the CCMA and the technical deficiencies of the1992 health risk assessment. Please see our June 29, 1993, preliminary DEIS comments; February 15, 1994, DEIS comments; and June 3, 1996 Final EIS comments.

EPA has rated this DEIS as 3 - Inadequate Information (see enclosed "Summary of Rating Definitions"). Pursuant to Section 309 of the Clean Air Act, EPA could refer this action to the President's Council on Environmental Quality (CEQ), if we determine that the public health or environmental quality impacts are unsatisfactory after additional information and analyses are provided. However, we believe we have a significant opportunity to collaborate on the development of an asbestos exposure evaluation (currently being conducted by EPA), and incorporate this information in a Revised or Supplemental DEIS. It is consistent with the

missions of both of our agencies to cooperate on the important public health issues associated with recreational use at the CCMA.

The CCMA is underlain by serpentinite, the parent rock for asbestos. BLM has designated 30,128 acres of the CCMA as an Asbestos Hazard Area of Critical Environmental Concern (ACEC). The OHV recreation area includes the ACEC. Exposure to asbestos at the high levels found by EPA in the CCMA can lead to harmful health effects, including lung cancer, mesothelioma, and other non-cancer, life threatening diseases.[1] The DEIS continues to rely on an inadequate 1992 health risk assessment and does not adequately characterize exposure to asbestos in the CCMA for common activities, including OHV use, recreation, camping, and occupational activities; the potential impacts to smokers and young children; or indirect effects from asbestos tracked outside of the CCMA. Based on our review of the DEIS, we have concluded that the information in the DEIS does not adequately assess potentially significant impacts to human health from the proposed action and alternatives.

This fall, EPA initiated a new asbestos exposure evaluation in the CCMA. The purpose of this evaluation is to provide accurate information on asbestos exposure associated with typical activities in the CCMA. Preliminary sampling from a dry period in September, 2004, shows substantially higher exposure values in the CCMA than those used in the BLM's 1992 risk assessment. The additional information that will be gained from EPA's exposure evaluation is critical to an informed decision regarding future CCMA management. Since sampling needs to be conducted in both the dry and wet seasons, we expect validated data to be available in June, 2005. Therefore, we recommend that BLM rely on EPA's completed exposure evaluation to recalculate the health risk, and incorporate this information in a Revised or Supplemental DEIS.

Because of the potential for significant health impacts, the Revised or Supplemental DEIS should also analyze a full array of reasonable alternatives and mitigation measures in order to avoid or reduce these impacts. Other reasonable alternatives that are not evaluated in the current DEIS include: complete closure of the CCMA, complete closure of the CCMA during the dry season, and implementation of mitigation measures to reduce human exposure to asbestos. Mitigation measures that merit further consideration include: requiring permits for CCMA access; requiring permit holders to sign an informed consent waiver; limiting the number of days per year an individual may enter the area; restricting access by young children; prohibiting camping inside the Asbestos Hazard Area; eliminating events that result in extraordinary high OHV use; mandatory decontamination of vehicles prior to leaving the CCMA; and mandatory use of respirators (e.g., during certain exposure periods/activities).

EPA is committed to sharing the data and conclusions from the exposure evaluation as they become available so that your decision for future management of the CCMA is based on the

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[1]Source: EPA's Integrated Risk Information System (IRIS); Agency for Toxic Substances and Disease Registry: Toxicological Profile for Asbestos.

most accurate and updated information. In the interim, we recommend that BLM immediately implement all mitigation and monitoring commitments from the 1999 ROD.

In addition to our primary concern with asbestos exposure and associated health risks, EPA has also identified other environmental issues of concern. EPA has concerns regarding potential impacts to air quality from small particulate matter (PM10) emissions. We commend BLM for reclaiming several abandoned mines in the CCMA and closing them to OHV use in order to reduce mercury loadings in the Clear Creek watershed. OHV activities continue to degrade overall water quality in the CCMA, however, and the DEIS provides insufficient information on existing water quality, and whether the proposed action would improve water quality to acceptable levels. Furthermore, we are requesting additional information regarding impacts to the threatened San Benito Evening Primrose.

We appreciate the opportunity to review this DEIS and request a copy of the Revised or Supplemental DEIS when it is filed with our Washington, D.C. office. We will be sharing our exposure evaluation findings with you as they become available, and are committed to working with you to provide you with the most accurate information with which to make a decision on future CCMA management. If you have any questions, please call me at (415) 947-8702 or Enrique Manzanilla, Director of the Community and Ecosystems Division at (415-972-3843, or have your staff contact Jeanne Geselbracht at (415) 972-3853.

Sincerely,

for

Wayne Nastri
Regional Administrator

004159

Enclosures: EPA Detailed Comments
Summary of Rating Definitions
Comparison of Clear Creek Management Area Air Concentrations
ATSDR Toxicological Profile for Asbestos

cc: Mike Chrisman, California Resources Agency
Jim Branham, California Environmental Protection Agency
Allan Lloyd California Air Resources Board
BB Blevins, California Department of Toxic Substances Control
Ruth Coleman, California State Parks
Richard Boyd, California Air Resources Board
Peter Venturini, California Air Resources Board
Caren Trgovcich, California Department of Toxic Substances Control

Steve Ross, California Department of Toxic Substances Control
Janet Brennan, Monterey Bay Unified Air Pollution Control District
Hector Guerra, San Joachin Valley Air Pollution Control District
Doug Gouzie, Central Coast Regional Water Quality Control Board
Pam Buford, Central Valley Regional Water Quality Control Board
Lowell Landowski, California State Parks
Alex Gonzalez, California State Lands Commission
Connie Rutherford, U.S. Fish and Wildlife Service, Ventura
Maria Barcos-Wallace, U.S. Occupational Safety and Health Administration, San Francisco
Anne Miller, EPA Office of Federal Activities, Washington, D.C.

EPA DETAILED COMMENTS ON THE CLEAR CREEK MANAGEMENT AREA RESOURCE MANAGEMENT PLAN AMENDMENT DEIS, NOVEMBER, 2004

Human Health Risk

The proposed alternative, which allows continued recreational use in the Clear Creek Management Area (CCMA), is likely to pose a significant public health risk from exposure to naturally occurring asbestos. Exposure to asbestos at high levels can lead to harmful health effects, including lung cancer, mesothelioma, and other non-cancer, life threatening diseases.[2] As we have indicated in the past, the CCMA's geology makes it an unsuitable location for OHV recreation. In previous comments on the CCMA[3], EPA objected to BLM's risk assessment and recommended the evaluation of alternatives and/or additional mitigation measures that could accomplish BLM's goals for the CCMA while fully protecting public health and environmental resources. This DEIS continues to rely on an inadequate 1992 health risk assessment and does not adequately characterize exposure to asbestos in the CCMA for common activities such as off-highway vehicle (OHV) recreation, camping, and occupational activities.

Preliminary results from recent EPA sampling efforts provide further evidence that the 1992 risk assessment underestimates asbestos exposure at CCMA. EPA is conducting a new exposure evaluation in the CCMA to provide updated and accurate information on asbestos exposure from disturbance of soil containing asbestos. Our preliminary sampling in the dry season has revealed *substantially higher exposure values* in the CCMA than those used in the 1992 risk assessment. For example, EPA data indicate the tail rider in a line of three motorcycles was exposed to 0.955 fibers/cubic centimeter (f/cc), which is nine times the highest concentration reported for a tail motorcycle rider in the 1992 risk assessment, as well as nine times the Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL) of 0.1 f/cc. (Although the OSHA PEL is not applicable to the general public, per our comments below, it has been used over the years by BLM and the public for comparison purposes). This high exposure concentration, which occurred during dry conditions, may not represent exposure concentrations under all conditions at the CCMA. EPA has conducted additional sampling in the wet season, and will complete dry season sampling in the spring of 2005. We expect validated data to be available in June, 2005.

EPA's preliminary data indicate a potentially higher risk to OHV users than BLM's 1992 risk assessment. EPA's complete evaluation will sample a range of conditions and analyze all samples with transmission electron microscopy (TEM) analysis. TEM analysis is better able to resolve fiber types and dimensions than phase contrast microscopy (PCM), which was used in the

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[2]Source: EPA's Integrated Risk Information System (IRIS); Agency for Toxic Substances and Disease Registry: Toxicological Profile for Asbestos.

[3]See EPA's June 29, 1993 comments on BLM's preliminary DEIS; February 15, 1994 comments on the DEIS; and June 3, 1996 comments on the FEIS.

1992 risk assessment. EPA's complete exposure evaluation will provide important information for BLM in the development of alternatives and mitigation measures at the CCMA.

> **Recommendation:** We strongly recommend that BLM incorporate the results of EPA's completed exposure evaluation in a Revised or Supplemental DEIS to insure the scientific integrity of the discussions and analyses (40 CFR 1502.24) used to inform BLM's decision. EPA is committed to sharing our data and analysis and working with BLM as this information becomes available.

Risks to children and smokers need to be assessed. Our comments on BLM's programmatic EIS identified the need for additional information regarding the potential health risks to children and smokers. Young children exposed to asbestos in the CCMA have a higher risk of developing mesothelioma during their lifetime than older adults because the latency period for developing this cancer can be 30 to 40 years. Even brief exposures to asbestos levels found in the CCMA may cause fibers to remain in the lungs for an extended period of time. Therefore, the exposure does not end when the visitor leaves the CCMA. Furthermore, intense repeated exposures during periods as short as several months can lead to asbestosis.[4] The cancer risk from asbestos exposure is also much greater for smokers than for non-smokers. The current DEIS does not address these important issues.

> **Recommendation:** The Revised or Supplemental DEIS should discuss each alternative's potential direct and indirect impacts to CCMA visitors, including young children and smokers. BLM should base its decision regarding future CCMA management on appropriate risk values for all potential CCMA users for various activities, combinations of activities, and frequency/duration of use.

Risks associated with offsite track-out of asbestos need to be assessed. Our comments on BLM's programmatic EIS also identified the need for additional information regarding the potential health risks associated with the exposure caused by asbestos dust that is carried offsite (track-out) on clothing and vehicles. Track-out is an indirect effect (40 CFR 1508.8(b)) of driving on serpentenite. Without proper washing facilities at CCMA exit points, track-out of asbestos dust from vehicles can result in asbestos exposure in homes and driveways, car washes, and other public places visited by recreationists after leaving the CCMA. Asbestos on CCMA recreationists' clothing can also be carried into homes, restaurants, stores, and other public places where other people may be exposed to it. Regular contact with dust from asbestos-laden clothing can cause asbestos-related respiratory diseases in people who have not had direct contact with the original asbestos source.[5] In addition, asbestos can remain in car vents and interiors as a

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[4]American Thoracic Society, Diagnosis and Initial Management of Nonmalignant Diseases Related to Asbestos, American Journal of Respiratory Critical Care Medicine, v. 170, 641-715, 2004.

[5]Agency for Toxic Substances and Disease Registry: Toxicological Profile for Asbestos, 179.

continuing source of asbestos exposure. Asbestos mud and dust tracked out of the CCMA can be a source of exposure every time it is redisturbed.

> **Recommendation:** The Revised or Supplemental DEIS should describe the potential track-out scenarios to homes, vehicle interiors, car washes, and public places recreationists may visit after leaving the CCMA. The document should describe the potential asbestos exposure to CCMA visitors, their families, and the public outside of the CCMA from track-out of asbestos-containing mud and dust on vehicles, clothing, and equipment. The discussion should include the effects of continuing exposures from track-out, and explain how the risk values were determined. The feasibility of constructing vehicle wash facilities at some or all CCMA exit points should be evaluated.

OSHA standards do not apply to the general public. The DEIS documents BLM's continued use of OSHA's permissible exposure limit (PEL) of 0.1 f/cc of air to determine "safe" levels of asbestos exposure for CCMA visitors. In addition, each month BLM's "Clear Creek Bulletin" posts recently monitored asbestos values in the CCMA and implies that conditions below the OSHA PEL are "low dose" exposures and safe. However, the levels of asbestos observed in the CCMA are high doses for the general public. Furthermore, the "Clear Creek Bulletin" inaccurately states that OSHA recommends wearing a respirator if asbestos values are above the PEL. OSHA regulations require employees working in the regulated area to comply with all relevant asbestos regulations, but they do not include recommendations to the general public. EPA has previously indicated to BLM that the OSHA PEL is inappropriate for determining "safe" asbestos exposure levels for the general public visiting the CCMA. OSHA standards for public health and safety only apply to occupational settings. The PEL is not based on health risk to the general public, including young children. For this reason, use of the PEL as a "safety" standard in BLM public education outreach materials is misleading.

> **Recommendation:** BLM should not use the OSHA PEL as an indicator of safe conditions in the CCMA and discontinue these statements in the "Clear Creek Bulletin" and other public outreach and educational materials. Informational materials should disclose the potential health effects of asbestos exposure to the general public, including young children and smokers. Appropriate, scientifically based information is currently available in the Agency for Toxic Substances and Disease Registry's (ATSDR) "Toxicological Profile for Asbestos" (enclosed). The Revised or Supplemental DEIS should clarify that the OSHA PEL is an inappropriate standard to describe exposure at the CCMA for the general public.

Additional information is needed regarding compliance with OSHA regulations for BLM employees. While the OSHA PEL is inappropriate for determining "safe" asbestos exposure levels for the general public using the CCMA, the OSHA PEL applies to all BLM employees and contractors working in the CCMA. The DEIS (p. 3-14) states that BLM personnel are required to follow the OSHA regulations related to asbestos, including personal air monitoring, personal decontamination, and vehicle and equipment decontamination. BLM

personal monitoring data indicate that BLM staff working in the CCMA are frequently exposed to asbestos in exceedance of OSHA's PEL. Staff are also required to shower and change clothes before leaving the regulated zone. However, the DEIS does not mention BLM employees' requirement to wear respirators in the CCMA at all times and does not indicate whether or how BLM is complying with all OSHA regulations related to asbestos. The shower building and vehicle wash rack are located at an administrative site northwest of the Asbestos Hazard Area, and are not adjacent to the regulated zone in accordance with OSHA regulations.

> **Recommendation:** The Revised or Supplemental DEIS should describe all asbestos-related OSHA regulations that apply to BLM employees working in the CCMA, including requirements regarding respirators, protective clothing, decontamination, waste disposal, and personal air and medical monitoring, and discuss how BLM is currently meeting these requirements. The Revised or Supplemental DEIS should also describe how BLM will ensure compliance with OSHA regulations regarding location of the CCMA decontamination facilities.

The characterization of chrysotile asbestos should be revised. The DEIS describes chrysotile asbestos found at CCMA as short fiber asbestos, which is not supported by the data. The 1992 risk assessment relied on PCM measurements, which only detects long fibers. EPA's current exposure evaluation is examining both long and short fibers and has found significant levels of long fibers (PCME or phase contrast microscopy equivalent). As noted above, EPA is committed to sharing our data and analysis with BLM as this information becomes available.

> **Recommendation:** The Revised or Supplemental DEIS should eliminate any discussion of short fiber asbestos because this does not accurately reflect the data provided.

Alternatives Analysis and Mitigation Measures

The DEIS does not analyze a full range of alternatives and/or mitigation measures that accomplish BLM's goals while fully protecting public health. In accordance with the Council on Environmental Quality's (CEQ) NEPA implementation regulations, the EIS must include appropriate mitigation measures not already included in the proposed action or alternatives (40 CFR 1502.14(f)), and discuss appropriate means to mitigate adverse impacts (1502.16(h)).

With regard to mitigation measures, we are concerned that previous mitigation commitments have not been implemented by BLM and other actions have been taken since the previous ROD that conflict with these same commitments. For example, according to the 1996 FEIS, camping inside the Asbestos Hazard Area of Critical Environmental Concern (ACEC) increases the cancer risk to users. In EPA's 1996 FEIS comments, we recommended that camping within the Asbestos Hazard ACEC be excluded until the health risks were better known. Accordingly, in the 1999 ROD (p. 10), BLM committed to developing a plan, over the subsequent three years, to relocate staging areas outside of the ACEC and discouraging camping within the ACEC. The proposed alternative in the current DEIS allows for primitive camping

inside the Asbestos Hazard ACEC. We understand BLM recently constructed new restrooms in the existing staging areas (inside the Asbestos Hazard ACEC), which encourages both staging and camping in these areas. These actions are inconsistent with BLM's previous commitments.

In BLM's *"Issue Paper, EPA and BLM Clear Creek EIS Protest Resolution"* (p.2), BLM committed to enforcing a dry/high dust seasonal restriction such that "vehicles would be restricted to a series of maintained and possibly dust-suppressed roads." The 1999 ROD (p. 2) stated that seasonal route closures would be implemented during excessively dry periods, and the FEIS estimated that this would reduce OHV visitation by about 20 percent. The ROD (p. 10) also committed to dust suppressing staging areas and approximately 30 miles of main transportation routes "as appropriate" to reduce dust generation and associated asbestos exposure. The FEIS (p. 105) estimated that dust suppression should reduce asbestos emissions by approximately 50 percent.

Since the ROD was signed, we understand that BLM has never closed the CCMA due to dry conditions. This was also a key element in the U.S. Fish and Wildlife Service's 1997 Biological Opinion. We also understand that only a few miles of roads have been dust suppressed with water a few times in the last several years because water has not been available and road watering has not been very effective (pers. comm. between George Hill, BLM, and Jeanne Geselbracht, EPA, 9/9/04). Therefore, dust suppression measures have not been implemented effectively or consistently, and asbestos emissions have not been reduced. BLM also committed to constructing a vehicle wash rack to reduce track-out of asbestos and other particulates. This has not been constructed. The current DEIS proposes many of the same mitigation measures, but it is unclear whether resources would be available to implement them. For example, dust suppression with water trucks and a vehicle wash rack require water availability. However, the Implementation Plan (Appendix C) does not list developing a water source as an action item or give it a priority rating. Furthermore, Appendix C lists researching and implementation of dust controls as a midterm action, which would first occur in three to four years. Dust control should be a high priority and included as an Immediate Action.

> **Recommendation:** BLM should consider other reasonable alternatives and mitigation measures to reduce human exposure to asbestos in the CCMA. Additional alternatives should be evaluated including complete closure of the CCMA and full dry season closure of the CCMA. The Revised or Supplemental DEIS should also evaluate mitigation measures to reduce human exposure to asbestos. Mitigation measures that merit further consideration include: requiring permits for CCMA access; requiring permit holders to sign an informed consent waiver; limiting the number of days per year an individual may enter the area; restricting access to young children; prohibiting camping inside the Asbestos Hazard ACEC; eliminating events that result in extraordinary high OHV use; mandatory decontamination of vehicles prior to leaving the CCMA; and mandatory use of respirators.

The Revised or Supplemental DEIS should discuss how each of these measures, individually or in combination, could help to reduce asbestos exposure and potential health risks in the CCMA. The discussion should incorporate EPA's exposure evaluation and describe how the new exposure values were used to determine the risk reduction associated with these measures. The discussion should also identify the construction, operation, and maintenance costs, staffing needs, and feasibility of each measure, and indicate implementation and enforcement feasibility.

BLM should address the availability of water for dust suppression and vehicle decontamination; and discuss whether chemical stabilization of the main routes (R001-R019) or smaller routes are feasible and cost effective.

The effectiveness of each measure should also be evaluated (e.g., 10 percent reduction of particulate emissions where measure is applied). BLM should commit to implementation, effectiveness, and validation monitoring for each measure, and the Revised or Supplemental DEIS should address how monitoring results will be used to adaptively manage the CCMA.

The Revised or Supplemental DEIS should describe the risks associated with camping in the Asbestos Hazard ACEC based on EPA's exposure evaluation, and identify alternatives to staging and camping in the ACEC.

Dry season closures need to be clarified. Under the proposed action, all routes except R001 through R019 would be closed during "dry" conditions based on air monitoring if the OSHA PEL is reached in two consecutive weeks. The OSHA PEL is not an appropriate criterion to determine dry conditions. Furthermore, the projected benefits of partial route closure, especially with respect to asbestos exposure to individuals using the remaining open routes, is not described.

Recommendation: BLM should discontinue using the OSHA PEL for determining dry season closures, and the Revised or Supplemental DEIS should specify that it will not be used. The Revised or Supplemental DEIS should describe the estimated air pollutant emissions reductions and any benefit from reduced asbestos exposures that would result from partial route closure during "dry" conditions.

Dust suppression triggers need to be identified. The DEIS (p. 4-3) states that BLM would dust suppress main routes during high use periods in dry dusty conditions but does not define the specific criteria that would be used to determine these conditions. Would they be the same as those that would close all routes except R001 through R019?

Recommendation: In evaluating alternatives or mitigation measures that involve closure and/or road watering during dry conditions, BLM should develop appropriate criteria based on soil moisture and associated health risk. The Revised or Supplemental DEIS

should identify and discuss the new criteria. Furthermore, in determining closures, the variability of soil moisture from place to place across the CCMA should be considered. BLM should also commit to watering roads during all high use periods in dry conditions.

Other Air Resources

Additional information on particulate matter emissions and vehicle miles traveled is needed. The DEIS (p. 4-2,3 and Appendix I) states that the proposed action would reduce particulate emissions and asbestos dust generation and improve air quality. The DEIS (p. 4-13) also states, "[a]n overall reduction in the area available for vehicle access may have little effect to reduce airborne asbestos emissions." The DEIS indicates that the No Action Alternative would result in direct impacts to air quality, associated asbestos emissions, and human health from unrestricted vehicle use (p. 4-4 and Appendix I) and that mobile sources operating within the CCMA may be causing exceedences of the State and Federal standards for PM10 (particulate matter smaller than ten microns) (p. 3-3). Appendix G indicates that PM10, PM2.5 (particulate matter smaller than 2.5 microns), and total suspended particulate emissions would be virtually the same, in tons per year, under the proposed action as under No Action. This is because the vehicle miles traveled (VMT) would be the same for each alternative. However, particulate concentrations (expressed in terms of mass of pollutant per volume of air, consistent with the National Ambient Air Quality Standards (NAAQS)) could potentially increase under the proposed action if the VMT would be concentrated on significantly fewer miles of routes and fewer acres of barren slopes than under the No Action Alternative. Therefore, the concentrations of particulate, including asbestos, to which OHV recreationists may be exposed could be higher under the proposed action than under the no action alternative.

The 24-hour and annual NAAQS for PM10 are 150 micrograms per cubic meter (ug/m^3) and 50 ug/m^3, respectively. In BLM's *"Issue Paper, EPA and BLM Clear Creek EIS Protest Resolution,"* BLM committed to conducting additional modeling, in cooperation with local air boards, to determine more clearly whether PM10 standards would be met under the proposed action. However, modeling to determine consistency with air quality standards has not been done, and the DEIS provides only emissions estimates, which cannot be compared with the NAAQS or State ambient air quality standards. In addition, the DEIS (p. 3-32) indicates that visitor use is increasing at a rate of about five percent per year. Although Appendix G projects particulate emissions for each alternative, it is unclear which year's VMT were used to calculate these emissions.

Recommendation: The Revised or Supplemental DEIS should provide current VMT and PM10 and PM2.5 emissions in the CCMA. The BLM should conduct air quality dispersion modeling based on projected PM10 and PM2.5 emissions for each alternative for 2005 and subsequent years of this management plan. These projections, which should include special events such as OHV rallies, should be provided in the Revised or Supplemental DEIS and compared with the NAAQS. The Revised or Supplemental DEIS should discuss how BLM would ensure compliance with appropriate standards and

identify and describe mitigation measures that would be applied to further reduce emissions.

Road surface moisture should be reassessed in the particulate matter estimates. EPA has reviewed BLM's "Spreadsheet Estimate of Total Particulate Matter Emissions by Alternative." The estimates and underlying assumptions are well documented and well presented. However, the assumption for surface material moisture content is based on national soil moisture maps prepared by the National Oceanic and Atmospheric Administration, from which BLM derived a value of 40 percent for winter and 28 percent for summer for the project area. These values seem extraordinarily high considering that EPA's AP-42, Section 13.2.2 Unpaved Roads, which provides the equations used in developing the emission factors for the analysis, cites a default moisture content value of 0.5 percent. While AP-42 discourages use of that default value, the ranges of source conditions (for surface material moisture content) that were tested in developing the equations are 0.03 to13 percent (see AP-42, Section 13.2.2, Table 13.2.2-3). Therefore, we believe that the assumed values of 28 percent and 40 percent may be too high. For comparison purposes, if the default value were used instead, the emissions estimates for PM-2.5 and PM-10 would be approximately 2.4 times higher and the total suspended particulates (TSP) estimate would be approximately 3.5 times higher than those presented in the DEIS.

Recommendation: BLM should clarify the use of the high road surface material moisture content values, or recalculate the particulate matter emissions from unpaved road use under each of the alternatives based on a site-specific determination of representative road surface moisture content (percent), using the field sampling and laboratory analysis procedures contained in AP-42, Appendices C.1 and C.2. Otherwise, BLM should use the default value in AP-42. The Revised or Supplemental DEIS should provide the revised emissions estimates and revise the conclusions of the air quality evaluation accordingly.

Water Quality and Watershed Resources

The Clean Water Act requires that existing instream water uses and water quality necessary to protect the existing beneficial uses shall be maintained and protected. However, it is unclear from the information provided in the DEIS whether BLM's proposal will adequately protect water quality. BLM should incorporate appropriate best management practices (BMPs) and other necessary measures to enable full protection of beneficial uses of waters, attainment of surface water quality standards, and compliance with the Clean Water Act (40 CFR 131.12).

Pursuant to the Clean Water Act, especially Section 313, BLM has an obligation to assure that all water quality standards, both narrative and numeric, are met in all waters of the CCMA and downstream waters for all water quality parameters at all times. BLM's monitoring and mitigation program must be adequate to demonstrate that the CCMA complies with or is progressing toward compliance with the Clean Water Act (and implementing regulations) within a reasonable period of time.

Sediment reduction targets. The existing average sediment yields from undisturbed soil, barren hillclimbs, and the road network in the CCMA are 3.2 tons/acre/year, 4.9 to 16 tons/acre/year, and 80.2 tons/acre/year, respectively (DEIS, p. 3-11). In our comments on the previous DEIS and FEIS, we recommended that BLM specify objectives for erosion reduction (e.g., a given percent of reduction in all areas) based on the needs of watershed restoration and BLM's responsibilities to protect soil resources and comply with water quality standards and objectives, rather than identifying a range of road miles without specific erosion reduction targets. We recommended that BLM use these goals to determine the acceptable mileage and categories of routes that could remain open. The DEIS does not set or assess specific erosion reduction targets for each watershed, or provide estimates of sediment yield reductions as a result of best management practices implemented since the 1999 ROD.

According to the DEIS (p. 4-9), the current overall sediment yield from roads in the CCMA is estimated to be 24,969 tons/year. The proposed action would reduce this to 16,680 tons/year. This appears to be an improvement, but it is unclear how this projected yield would be spread out over the CCMA. The significance of this projected reduction is unknown with respect to each watershed and other resources such as the San Benito Evening Primrose, which is listed as threatened under the Endangered Species Act. Therefore, it remains unclear whether the proposed action would result in continued extreme sediment yields for specific watersheds. With no watershed targets or action levels, the DEIS is unclear how monitoring results will be used to adaptively manage the CCMA and what conditions would trigger specific mitigation measures.

> **Recommendation:** The Revised or Supplemental DEIS should project sediment yields (in tons/acre/year) for each watershed, and identify sediment reduction targets for each watershed based on watershed restoration and water quality needs. The discussion should address how mitigation measures are expected to ensure that sediment reduction targets are met and the feasibility of implemention. The discussion should address the construction, operation, and maintenance costs of each measure, as well as staffing needs, practicability issues, and the likelihood of implementation. The effectiveness of each measure should also be described and assessed (e.g., percent reduction of sediment yield where measure is applied). BLM should commit to implementation, effectiveness, and validation monitoring for each measure, and the Revised or Supplemental DEIS should thoroughly describe and discuss how monitoring results would be used to adaptively manage the CCMA.

Asbestos contamination of surface waters. Review of water quality data indicate that asbestos concentrations in Hernandez Reservoir likely exceed the Federal water quality standard to protect drinking water. Furthermore, in a September 4, 1996, meeting with EPA, BLM indicated that only one water sample was collected for asbestos analysis in Clear Creek, and that sample exceeded the water quality standard. The water quality standard for asbestos is 7,000,000 fibers/liter. Data also indicate that several water bodies on the east side of the CCMA are adversely affected by the transport of sediment and asbestos from the CCMA. Such impacts appear to constitute violations of State numeric and narrative water quality standards for the

protection of several designated beneficial uses (objectives pursuant to California's Porter-Cologne Act).

In BLM's February 19, 1998, response to EPA's FEIS protest letter, BLM committed to conducting more studies to determine the causes of elevated asbestos and mercury levels in CCMA watersheds. In addition, the 1999 ROD (p.7) stated that, because heavy metals and asbestos were concerns in this area, BLM had contracted a water quality study in 1997 to determine the magnitude of heavy metals being deposited into streams from 15 abandoned mines.

Although BLM has acknowledged asbestos contamination of surface waters as a problem, it appears that neither the 1997 study nor any subsequent monitoring addressed asbestos. The current DEIS does not provide adequate information regarding either existing conditions or potential impacts of the alternatives from asbestos contamination to demonstrate current or future compliance with the applicable standard.

> **Recommendation:** BLM should conduct additional water quality sampling of asbestos in the water column to assess whether asbestos water quality standards for the protection of municipal water supply (MUN) are being met. The sampling plan should be designed to assess water in Clear Creek and Hernandez Reservoir. A minimum of 15 samples would provide sufficient information regarding water quality for this parameter. Sites where the asbestos standard is exceeded may indicate areas vulnerable to soil erosion. These areas would need special protection from OHVs and additional erosion control management practices.

Control of mercury loads. We wish to acknowledge BLM's efforts in reducing mercury loads to Clear Creek. Earlier this year, a total maximum daily load (TMDL) for mercury in Clear Creek was finalized by the California Regional Water Quality Control Board (RWQCB), Central Coast Region, and approved by EPA. The total mercury objective for Clear Creek is 0.050 micrograms per liter (*ug*/L). Mercury in Clear Creek continues to exceed this objective. However, according to the RWQCB[6], data suggest the BLM has properly identified the source of mercury runoff entering Clear Creek and has taken proper steps to reduce or eliminate this load. The RWQCB has also indicated that high-use OHV areas are not a significant source of mercury loading; and abandoned mine lands may no longer be contributing appreciable loads of mercury to Clear Creek, possibly because of BLM's recent efforts to remediate those mine areas. Recent erosion control and mercury load control efforts at abandoned mines in the CCMA have included removal and/or entombment of mining wastes, capping of residual material with clean, native soil, revegetation of disturbed areas, and monitoring.

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[6]Central Coast Regional Water Quality Control Board, Total Maximum Daily Load Technical Support Analysis for Mercury Impairment of Clear Creek and Hernandez Reservoir, 2/25/04.

Other pollutants in CCMA watersheds. Although it appears that reclamation of abandoned mines has reduced mercury loads in Clear Creek, it is unclear from the information in the DEIS how effectively other pollutants will be reduced in the CCMA watersheds. In previous correspondence (July 8, 1994 and June 3, 1996), EPA specifically noted the lack of information on existing water quality, and potential impacts of the proposal on beneficial uses and water quality standards, especially in east side streams. We provided some information to BLM and recommended that additional information be obtained in order to make informed decisions about the existing and potential environmental impacts from CCMA management. The information provided by EPA included the following:

- Lead and chromium concentrations in Panoche/Silver Creek have exceeded state objectives for drinking water during large runoff events;
- Detection levels for cadmium, lead, and mercury are too high on Los Gatos/Arroyo Pasajero to detect threats to aquatic life;
- Selenium concentrations have exceeded Federal standards and State objectives for aquatic habitat protection and drinking water in Panoche/Silver Creek;
- Selenium concentration violations may occur in Cantua and San Benito Creeks;
- Boron concentrations in Panoche/Silver, Cantua, and Los Gatos Creeks exceed Federal recommended standard (.55 mg/l) for protection of aquatic habitat; and
- Mercury impairment is documented in San Carlos and Panoche Creeks.

The DEIS provides little additional information regarding water quality in these east side watersheds. It is unclear whether BLM has a plan for obtaining water quality data for the east side streams and adaptively managing them.

Recommendation: For the east side streams in the CCMA, the Revised or Supplemental DEIS should provide readily available water quality information; identify specific reduction targets for soil erosion, sediment yield, and metals; and discuss BLM plans for watershed monitoring and adaptive management.

Management alternatives and effects on water quality. The DEIS indicates that if a route is difficult to manage and too costly to maintain, the route's management objective could be changed to reduce the level/cost of necessary maintenance. However, changing the route management objective to reduce the level of required maintenance could result in negative impacts to soils, vegetation, and water quality.

Recommendation: We recommend that prior to changing route management objectives to reduce maintenance requirements, BLM should evaluate whether this would result in

increased soil erosion, adverse impacts to vegetation or water quality, or other impacts. BLM should consider route closure as an adaptive management alternative if routes become too difficult or costly to properly maintain.

Biological Resources

The San Benito Evening Primrose (*Camissonia benitensis*) is a threatened plant species endemic to the CCMA. In its 1997 Biological Opinion pursuant to Section 7 of the Endangered Species Act, the U.S. Fish and Wildlife Service stated that minimizing surface disturbance from anthropogenic causes and minimizing alteration of hydrologic processes are key to protecting this species. Management actions to minimize habitat disturbance by vehicles included route closures, fences, barriers, signing, visitor education, and law enforcement; however, anthropogenic disturbance of *Camissonia benitensis* habitat continues (pers. comm. J. Delgado, BLM, to J. Geselbracht, EPA). We understand that BLM will be consulting with the U.S. Fish and Wildlife Service on this current DEIS, and a new Biological Opinion will be issued.

Recommendation: The Revised or Supplemental DEIS should discuss how BLM intends to meet its responsibilities pursuant to the Endangered Species Act to protect *Camissonia benitensis* and its habitat from further destruction, including additional area closures if appropriate. The document should identify the costs and staffing needed to fully comply with the new Biological Opinion.

The 1997 Biological Opinion assumed that approximately 30 miles of main transportation routes would be dust-suppressed. The Biological Opinion determined that, because the bulk of sediment entering Clear Creek results from erosion of unpaved roads, successful dust suppression adjacent to Clear Creek would benefit *Camissonia benitensis* and promote proper functioning of its stream terrace habitat by reducing the transport and delivery of sediment into its habitat.

Recommendation: The Revised or Supplemental DEIS should discuss how the lack of dust suppression on unpaved roads in the CCMA has affected and would continue to affect *Camissonia* populations.

Other Comments

Several mistakes and/or missing information in the DEIS should be rectified or added in the Revised or Supplemental DEIS, including:

- The DEIS does not include a bibliography.
- The DEIS does not include a section on consultation.

- It appears that there is a typo in Appendix B. To be consistent with the map for Alternative A, Barren 6x should be designated as closed rather than open.

- The maps for alternatives A through D should depict the Wilderness Study Area, staging areas, designated campgrounds, and other areas proposed to be open to camping.

U.S. Environmental Protection Agency Rating System for Draft Environmental Impact Statements Definitions and Follow-Up Action*

Environmental Impact of the Action

LO – Lack of Objections

The U.S. Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC – Environmental Concerns

EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

EO – Environmental Objections

EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU – Environmentally Unsatisfactory

EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1 – Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2 – Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

Category 3 – Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment. February, 1987.

Comparison of Clear Creek Management Area Air Concentrations (f/cc), 1992 BLM Risk Assessment vs. 2004 EPA Sampling Event

1992 BLM Risk Assessment (Phase Contrast Microscopy (PCM))	EPA 9/15/04 Sampling Event (Transmission Electron Microscopy, expressed as PCM Equivalents)
Motorcyle Riding	**Motorcycle Riding**
Lead Rider Mean = .018 Range = .01 - .035	Lead Rider (25% riding) 0.044
Mid Rider Mean = .042 Range = .01 - .08	Mid Rider 0.659
Tail Rider Mean = .039 Range = 0.01 - 0.1	Tail Rider 0.955
SUV Riding - open vehicle	**SUV Riding - open vehicle**
SUV riding Mean = .035 Range <0.01 - .097	Lead SUV Driver 0.100 Trailing SUV Driver 0.229 Trailing SUV Passenger 0.523
Ambient	**Ambient**
Non-hazardous Area	**Non-hazardous Area**
No data	Human Visitor - Oak Flat Campground 0.0252 Stationary Sampler - Oak Flat Campground 0.00649
Hazardous Area	**Hazardous Area**
Human Visitor (no vehicle activity) Mean = < 0.01 Range = < 0.01 - 0.01	Human Visitor (no vehicle activity) <0.0976 Stationary Sampler <0.00110

Toxicological Profile for

ASBESTOS

(Update)

DEPARTMENT OF HEALTH & HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry

1. PUBLIC HEALTH STATEMENT

This public health statement tells you about asbestos and the effects of exposure.

The Environmental Protection Agency (EPA) identifies the most serious hazardous waste sites in the nation. These sites make up the National Priorities List (NPL) and are the sites targeted for long-term federal cleanup activities. Asbestos has been found in at least 83 of the 1,585 current or former NPL sites. However, the total number of NPL sites evaluated for this substance is not known. As more sites are evaluated, the sites at which asbestos is found may increase. This information is important because exposure to this substance may harm you and because these sites may be sources of exposure.

When a substance is released from a large area, such as an industrial plant, or from a container, such as a drum or bottle, it enters the environment. This release does not always lead to exposure. You are exposed to a substance only when you come in contact with it. You may be exposed by breathing, eating, or drinking the substance, or by skin contact.

If you are exposed to asbestos, many factors determine whether you'll be harmed. These factors include the dose (how much), the duration (how long), the fiber type (mineral form and size distribution), and how you come in contact with it. You must also consider the other chemicals you're exposed to and your age, sex, diet, family traits, lifestyle (including whether you smoke tobacco), and state of health.

1.1 WHAT IS ASBESTOS?

Asbestos is the name given to a group of six different fibrous minerals (amosite, chrysotile, crocidolite, and the fibrous varieties of tremolite, actinolite, and anthophyllite) that occur naturally in the environment. One of these, namely chrysotile, belongs to the serpentine family of minerals, while all of the others belong to the amphibole family. All forms of asbestos are hazardous, and all can cause cancer, but amphibole forms of asbestos are considered to be somewhat more hazardous to health than chrysotile. Asbestos minerals consist of thin, separable

fibers that have a parallel arrangement. Nonfibrous forms of tremolite, actinolite, and anthophyllite also are found naturally. However, because they are not fibrous, they are not classified as asbestos minerals. Amphibole asbestos fibers are generally brittle and often have a rod- or needle-like shape, whereas chrysotile asbestos fibers are flexible and curved. Chrysotile, also known as white asbestos, is the predominant commercial form of asbestos; amphiboles are of minor commercial importance. Asbestos fibers do not have any detectable odor or taste. They do not dissolve in water or evaporate and are resistant to heat, fire, chemical and biological degradation. Because of these properties, asbestos has been mined for use in a wide range of manufactured products, mostly in building materials, friction products, and heat-resistant fabrics. Since asbestos fibers may cause harmful health effects in people who are exposed, all new uses of asbestos have been banned in the United States by the EPA.

See Chapters 4 and 5 for more information on the properties and uses of asbestos.

1.2 WHAT HAPPENS TO ASBESTOS WHEN IT ENTERS THE ENVIRONMENT?

Asbestos fibers do not evaporate into air or dissolve in water. However, pieces of fibers can enter the air and water from the weathering of natural deposits and the wearing down of manufactured asbestos products. Small diameter fibers and fiber-containing particles may remain suspended in the air for a long time and be carried long distances by wind or water currents before settling. Larger diameter fibers and particles tend to settle more quickly. Asbestos fibers are not able to move through soil. They are generally not broken down to other compounds in the environment and will remain virtually unchanged over long periods. However, the most common form of asbestos, chrysotile, may have some minor mineral loss in acidic environments. Asbestos fibers may break into shorter pieces or separate into a larger number of individual fibers as a result of physical processes. When asbestos fibers are breathed in, they may get trapped in the lungs. Levels of fibers in lung tissue build up over time, but some fibers, particularly chrysotile fibers, can be removed from or degraded in the lung with time.

See Chapters 5 and 6 for more information on the behavior of asbestos in the environment.

1.3 HOW MIGHT I BE EXPOSED TO ASBESTOS?

Asbestos minerals are widespread in the environment. They may occur in large natural deposits, or as contaminants in other minerals. For example, tremolite asbestos may occur in deposits of chrysotile, vermiculite, and talc. Asbestos may be found in soil that is formed from the erosion of asbestos-bearing rock. You are most likely to be exposed to asbestos by breathing in asbestos fibers that are suspended in air. These fibers can come from naturally-occurring sources of asbestos or from the wearing down or disturbance of manufactured products including insulation, automotive brakes and clutches, ceiling and floor tiles, dry wall, roof shingles, and cement. However, these products do not always contain asbestos. Low levels of asbestos that present little, if any, risk to your health can be detected in almost any air sample. For example, 10 fibers are typically present in a cubic meter (fibers/m^3) of outdoor air in rural areas. (A cubic meter is about the amount of air that you breathe in 1 hour.) Health professionals often report the number of fibers in a milliliter (mL) (equivalent to a cubic centimeter [cm^3]) of air rather than in a cubic meter of air. Since there are one million cm^3 (or one million mL) in a cubic meter, there typically would be 0.00001 fibers/mL of asbestos in air in rural areas. Typical levels found in cities are about 10-fold higher.

Close to an asbestos mine or factory, levels may reach 10,000 fibers/m^3 (0.01 fibers/mL) or higher. Levels could also be above average near a building that contains asbestos products and is being torn down or renovated or near a waste site where asbestos is not properly covered up or stored to protect it from wind erosion.

In indoor air, the concentration of asbestos depends on whether asbestos was used for insulation, ceiling or floor tiles, or other purposes, and whether these asbestos-containing materials are in good condition or are deteriorated and easily crumbled. Concentrations measured in homes, schools, and other buildings that contain asbestos range from about 30 to 6,000 fibers/m^3 (0.00003–0.006 fibers/mL). People who work with asbestos or asbestos-containing products (for example, miners, insulation workers, asbestos abatement workers, and automobile brake mechanics) without proper protection are likely to be exposed to much higher levels of asbestos fibers in air. In addition, custodial and maintenance workers who are making repairs or

installations in buildings with asbestos-containing materials may be exposed to higher levels of asbestos. Since vermiculite and talc may contain asbestos, occupational workers and the general population may be exposed to asbestos when using these products.

You can also be exposed to asbestos by drinking asbestos fibers that are present in water. Even though asbestos does not dissolve in water, fibers can enter water by being eroded from natural deposits or piles of waste asbestos, from asbestos-containing cement pipes used to carry drinking water, or from filtering through asbestos-containing filters. Most drinking water supplies in the United States have concentrations of less than 1 million fibers per liter (MFL), even in areas with asbestos deposits or with asbestos-cement water supply pipes. However, in some locations, water samples may contain 10–300 million fibers per liter or even higher. The average person drinks about 2 liters of water per day.

See Chapters 3 and 6 for more information on how you could be exposed to asbestos.

1.4 HOW CAN ASBESTOS ENTER AND LEAVE MY BODY?

If you breathe asbestos fibers into your lungs, some of the fibers will be deposited in the air passages and on the cells that make up your lungs. Most fibers are removed from your lungs by being carried away or coughed up in a layer of mucus to the throat, where they are swallowed into the stomach. This usually takes place within a few hours. Fibers that are deposited in the deepest parts of the lung are removed more slowly. In fact, some fibers may move through your lungs and can remain in place for many years and may never be removed from your body. Amphibole asbestos fibers are retained in the lung longer than chrysotile asbestos fibers.

If you swallow asbestos fibers (either those present in water or those that are moved to your throat from your lungs), nearly all of the fibers pass along your intestines within a few days and are excreted in the feces. A small number of fibers may penetrate into cells that line your stomach or intestines, and a few penetrate all the way through and get into your blood. Some of these become trapped in other tissues, and some are removed in your urine.

If you get asbestos fibers on your skin, very few of these fibers, if any, pass through the skin into your body.

See Chapter 3 for more information on how asbestos enters and leaves your body.

1.5 HOW CAN ASBESTOS AFFECT MY HEALTH?

To protect the public from the harmful effects of toxic chemicals and to find ways to treat people who have been harmed, scientists use many tests.

One way to see if a chemical will hurt people is to learn how the chemical is absorbed, used, and released by the body; for some chemicals, animal testing may be necessary. Animal testing may also be used to identify health effects such as cancer or birth defects. Without laboratory animals, scientists would lose a basic method to get information needed to make wise decisions to protect public health. Scientists have the responsibility to treat research animals with care and compassion. Laws today protect the welfare of research animals, and scientists must comply with strict animal care guidelines.

Information on the health effects of asbestos in people comes mostly from studies of people who were exposed in the past to levels of asbestos fibers (greater than or equal to 5 μm in length) in workplace air that were as high as 5 million fibers/m^3 (5 fibers/mL). Workers who repeatedly breathe in asbestos fibers with lengths greater than or equal to 5 μm may develop a slow buildup of scar-like tissue in the lungs and in the membrane that surrounds the lungs. This scar-like tissue does not expand and contract like normal lung tissue and so breathing becomes difficult. Blood flow to the lung may also be decreased, and this causes the heart to enlarge. This disease is called asbestosis. People with asbestosis have shortness of breath, often accompanied by a cough. This is a serious disease and can eventually lead to disability or death in people exposed to high amounts of asbestos over a long period of time. However, asbestosis is not usually of concern to people exposed to low levels of asbestos. Changes in the membrane surrounding the lung, called pleural plaques, are quite common in people occupationally exposed to asbestos and are sometimes found in people living in areas with high environmental levels of asbestos.

Effects on breathing from pleural plaques alone are usually not serious. There is conflicting evidence as to whether their presence in a person accurately predicts more serious disease development in the future.

Asbestos workers have increased chances of getting two principal types of cancer: cancer of the lung tissue itself and mesothelioma, a cancer of the thin membrane that surrounds the lung and other internal organs. These diseases do not develop immediately following exposure to asbestos, but appear only after a number of years. There is also some evidence from studies of workers that breathing asbestos can increase the chances of getting cancer in other locations (for example, the stomach, intestines, esophagus, pancreas, and kidneys), but this is less certain. Members of the public who are exposed to lower levels of asbestos may also have increased chances of getting cancer, but the risks are usually small and are difficult to measure directly. Lung cancer is usually fatal, while mesothelioma is almost always fatal, often within a few months of diagnosis. Some scientists believe that early identification and intervention of mesothelioma may increase survival.

The levels of asbestos in air that lead to lung disease depend on several factors. The most important of these are (1) how long you were exposed, (2) how long it has been since your exposure started, and (3) whether you smoked cigarettes. Cigarette smoking and asbestos exposure increase your chances of getting lung cancer. Also, there is a scientific debate concerning the differences in the extent of disease caused by different fiber types and sizes. Some of these differences may be due to the physical and chemical properties of the different fiber types. For example, several studies suggest that amphibole asbestos types (tremolite, amosite, and especially crocidolite) may be more harmful than chrysotile, particularly for mesothelioma. Other data indicate that fiber size dimensions (length and diameter) are important factors for cancer-causing potential. Some data indicate that fibers with lengths greater than 5.0 μm are more likely to cause injury than fibers with lengths less than 2.5 μm. (1 μm is about 1/25,000 of an inch.) Additional data indicate that short fibers can contribute to injury. This appears to be true for mesothelioma, lung cancer, and asbestosis. However, fibers thicker than 3.0 μm are of lesser concern, because they have little chance of penetrating to the lower regions of the lung.

The health effects from swallowing asbestos are unclear. Some groups of people who have been exposed to asbestos fibers in their drinking water have higher-than-average death rates from cancer of the esophagus, stomach, and intestines. However, it is very difficult to tell whether this is caused by asbestos or by something else. Animals that were given very high doses of asbestos in food did not get more fatal cancers than usual, although some extra nonfatal tumors did occur in the intestines of rats in one study.

Several government offices and regulatory agencies have considered all of the evidence regarding the carcinogenicity of asbestos. The Department of Health and Human Services (DHHS) has determined that asbestos is known to be a human carcinogen. The EPA has determined that asbestos is a human carcinogen. The International Agency for Research on Cancer (IARC) has determined that asbestos is carcinogenic to humans.

See Chapters 2 and 3 for more information on how asbestos can affect your health.

1.6 HOW CAN ASBESTOS AFFECT CHILDREN?

This section discusses potential health effects from exposures during the period from conception to maturity at 18 years of age in humans. Potential effects on children resulting from exposures of the parents are also considered.

Asbestos exposure in both children and adults may occur while breathing air in or near buildings (public or private) containing asbestos building materials or near asbestos-related industrial operations. Children breathe differently and have different lung structures than adults. It is not known if these differences may cause a greater amount of asbestos fibers to stay in the lungs of a child when they are breathed in than in the lungs of an adult. Children drink more fluids per kilogram of body weight than adults and can also be exposed through asbestos-contaminated drinking water. Eating asbestos-contaminated soil and dust is another source of exposure for children. Certain children intentionally eat soil, and all young children eat more soil than adults through hand-to-mouth activities. Historically, family members have also been exposed to asbestos that was carried home on the clothing of other family members who worked in asbestos

mesothelioma (another form of cancer associated with asbestos exposure). These diseases usually appear many years following the first exposure to asbestos and are therefore not likely to be seen in children. But since it may take up to 40 or more years for the effects of exposure to be seen, people who have been exposed to asbestos at a young age may be more likely to contract these diseases than those who are first exposed later in life. In the small number of studies that have specifically looked at asbestos exposure in children, there is no indication that younger people might develop asbestos-related diseases more quickly than older people. Developing fetuses and infants are not likely to be exposed to asbestos through the placenta or breast milk of the mother. Results of animal studies do not indicate that exposure to asbestos is likely to result in birth defects.

1.7 HOW CAN FAMILIES REDUCE THE RISK OF EXPOSURE TO ASBESTOS?

If your doctor finds that you have been exposed to significant amounts of asbestos, ask whether your children might also be exposed. Your doctor might need to ask your state health department to investigate.

The most important way that families can lower their exposures to asbestos is to be aware of the sources of asbestos in their homes and avoid exposure to these sources. The most important source of asbestos in a home is from damaged or deteriorating asbestos-containing insulation, ceiling, or floor tiles. Should you suspect that your house may contain asbestos, contact your state or local health department or the regional offices of EPA to find out how to test your home for asbestos and how to locate a company that is trained to remove or contain the fibers. Federal law requires schools to identify asbestos-containing material in school buildings and take appropriate action to control release of asbestos fibers.

If you live close to where asbestos and certain other ores are mined or processed, where a building that contains asbestos products is being torn down or renovated, or a waste site where asbestos is not properly covered, then the levels of asbestos in dust and wind-blown soil may be higher. Pets can also bring asbestos into the home by carrying dust or dirt on their fur or feet if they spend time in places that have high levels of asbestos in the soil. Swallowing of asbestos in

house dust or soil is a potential exposure pathway for children. This problem can be reduced in many ways. Regular hand and face washing to remove asbestos-containing dusts and soil, especially before meals, can lower the possibility of asbestos fibers on the skin being accidentally swallowed while eating. Families can lower exposures to asbestos by regularly cleaning the home of dust and tracked in soil. Door mats can help lower the amount of soil that is tracked into the home; removing your shoes before entering will also help. Planting grass and shrubs over bare soil areas in the yard can lower the contact that children and pets may have with soil and reduce the tracking of soil into the home.

You can bring asbestos home in the dust on your hands or clothes if you work in the mining or processing of minerals that contain asbestos, in asbestos removal, or in buildings with damaged or deteriorating asbestos. Federal law regulates work practices to limit the possibility of asbestos being brought home in this way. Your occupational health and safety officer at work can and should tell you whether chemicals you work with are dangerous and likely to be carried home on your clothes, body, or tools, and whether you should be showering and changing clothes before you leave work, storing your street clothes in a separate area of the workplace, or laundering your work clothes at home separately from other clothes. Your employer should have Material Safety Data Sheets (MSDSs) for many of the chemicals used at your place of work, as required by the Occupational Safety and Health Administration (OSHA). Information on these sheets should include chemical names and hazardous ingredients, important properties (such as fire and explosion data), potential health effects, how you get the chemical(s) in your body, how to handle the materials properly, and what to do in an emergency. Your employer is legally responsible for providing a safe workplace and should freely answer your questions about hazardous chemicals. Either OSHA or your OSHA-approved state occupational safety and health program can answer any further questions and help your employer identify and correct problems with hazardous substances. OSHA and/or your OSHA-approved state occupational safety and health program will listen to your formal complaints about workplace health hazards and inspect your workplace when necessary. Employees have a right to seek safety and health on the job without fear of punishment.

1.8 IS THERE A MEDICAL TEST TO DETERMINE WHETHER I HAVE BEEN EXPOSED TO ASBESTOS?

The most common test used to determine if you have received sustained exposure to asbestos is a chest x-ray. A chest x-ray is recommended for detecting exposure to asbestos only in persons who have sustained relatively heavy exposure. A chest x-ray is of no value for detecting evidence of asbestos exposure in a person whose exposure to asbestos has been only brief or transient. The x-ray cannot detect the asbestos fibers themselves, but it can detect early signs of lung disease caused by asbestos. While other substances besides asbestos can sometimes produce similar changes in the lungs, this test is usually reliable for detecting asbestos-related effects produced by long-term exposures at relatively high concentrations of asbestos fibers. Other tests, such as gallium-67 lung scanning and high-resolution computed tomography, are also useful in detecting changes in the lungs. However, there are currently no means of detecting exposure-related effects from commonly encountered environmental exposures.

The most reliable test to determine if you have been exposed to asbestos is the detection of microscopic asbestos fibers in pieces of lung tissue removed by surgery, but this is a very invasive test. A test can also be run to determine the presence of asbestos fibers in material rinsed out of the lung. However, this test can cause some discomfort. Asbestos fibers can also be detected in mucus (sputum), urine, or feces, but these tests are not reliable for determining how much asbestos may be in your lungs. Low levels of asbestos fibers are found in these materials for nearly all people. Higher-than-average levels can show that you have been exposed to asbestos, but it is not yet possible to use the results of this test to estimate how much asbestos you have been exposed to, or to predict whether you are likely to suffer any health effects.

See Chapters 3 and 7 for more information about how asbestos can be measured in people and in the environment.